

PATENT ASSIGNMENT

Electronic Version v1.1
 Stylesheet Version v1.1

| SUBMISSION TYPE: | NEW ASSIGNMENT | | | | | | | | | | |
|--|---|---------------|---|---------------------|--------------------|---------------------|------------|----------------|--------------|---------------------|------------|
| NATURE OF CONVEYANCE: | ASSIGNMENT | | | | | | | | | | |
| CONVEYING PARTY DATA | | | | | | | | | | | |
| <table border="1"> <thead> <tr> <th>Name</th> <th>Execution Date</th> </tr> </thead> <tbody> <tr> <td>Philip DORMITZER</td> <td>03/13/2012</td> </tr> <tr> <td>Michael FRANTI</td> <td>03/15/2012</td> </tr> <tr> <td>Peter MASON</td> <td>03/13/2012</td> </tr> <tr> <td>Pirada SUPHAPHIPHAT</td> <td>03/13/2012</td> </tr> </tbody> </table> | | Name | Execution Date | Philip DORMITZER | 03/13/2012 | Michael FRANTI | 03/15/2012 | Peter MASON | 03/13/2012 | Pirada SUPHAPHIPHAT | 03/13/2012 |
| Name | Execution Date | | | | | | | | | | |
| Philip DORMITZER | 03/13/2012 | | | | | | | | | | |
| Michael FRANTI | 03/15/2012 | | | | | | | | | | |
| Peter MASON | 03/13/2012 | | | | | | | | | | |
| Pirada SUPHAPHIPHAT | 03/13/2012 | | | | | | | | | | |
| RECEIVING PARTY DATA | | | | | | | | | | | |
| <table border="1"> <tr> <td>Name:</td> <td>Novartis Vaccines and Diagnostics, Inc.</td> </tr> <tr> <td>Street Address:</td> <td>4560 Horton Street</td> </tr> <tr> <td>City:</td> <td>Emeryville</td> </tr> <tr> <td>State/Country:</td> <td>CALIFORNIA</td> </tr> <tr> <td>Postal Code:</td> <td>94608</td> </tr> </table> | | Name: | Novartis Vaccines and Diagnostics, Inc. | Street Address: | 4560 Horton Street | City: | Emeryville | State/Country: | CALIFORNIA | Postal Code: | 94608 |
| Name: | Novartis Vaccines and Diagnostics, Inc. | | | | | | | | | | |
| Street Address: | 4560 Horton Street | | | | | | | | | | |
| City: | Emeryville | | | | | | | | | | |
| State/Country: | CALIFORNIA | | | | | | | | | | |
| Postal Code: | 94608 | | | | | | | | | | |
| PROPERTY NUMBERS Total: 3 | | | | | | | | | | | |
| <table border="1"> <thead> <tr> <th>Property Type</th> <th>Number</th> </tr> </thead> <tbody> <tr> <td>Application Number:</td> <td>13320902</td> </tr> <tr> <td>Application Number:</td> <td>61216919</td> </tr> <tr> <td>PCT Number:</td> <td>IB2010001332</td> </tr> </tbody> </table> | | Property Type | Number | Application Number: | 13320902 | Application Number: | 61216919 | PCT Number: | IB2010001332 | | |
| Property Type | Number | | | | | | | | | | |
| Application Number: | 13320902 | | | | | | | | | | |
| Application Number: | 61216919 | | | | | | | | | | |
| PCT Number: | IB2010001332 | | | | | | | | | | |
| CORRESPONDENCE DATA | | | | | | | | | | | |
| Fax Number: | (510)655-3542 | | | | | | | | | | |
| Email: | diana-1.castillo@novartis.com | | | | | | | | | | |
| <i>Correspondence will be sent to the e-mail address first; if that is unsuccessful, it will be sent via US Mail.</i> | | | | | | | | | | | |
| Correspondent Name: | Novartis Vaccines and Diagnostic, Inc. | | | | | | | | | | |
| Address Line 1: | 4560 Horton Street | | | | | | | | | | |
| Address Line 2: | IP Services M/S X-100B | | | | | | | | | | |
| Address Line 4: | Emeryville, CALIFORNIA 94608-2916 | | | | | | | | | | |
| ATTORNEY DOCKET NUMBER: | PAT053621-US-PCT | | | | | | | | | | |

NAME OF SUBMITTER:

Helen Lee

Total Attachments: 6

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ASSIGNMENT

For good and valuable consideration, the receipt and adequacy of which is hereby acknowledged, we

Philip DORMITZER, Michael FRANTI, Peter MASON, and Pirada SUPHAPHIPAT

do hereby sell, assign and transfer to **Novartis Vaccines and Diagnostics, Inc.**, a company organized under the laws of the State of Delaware, 4560 Horton Street, Emeryville, CA 94608, USA, (hereinafter referred to as the "**ASSIGNEE**") and its successors, assigns and legal representatives, all our right, title and interest for all countries of the world in and to (1) all of our inventions and discoveries described in the patent application(s) entitled

REVERSE GENETICS USING NON-ENDOGENOUS POL I PROMOTER

filed* in the RO/IE on May 21, 2010, and accorded International Patent Application Number PCT/PCT/IB2010/001332 (2) said patent application(s), (3) all national stages of said international patent application, (4) all other patent applications in all countries and regions claiming the priority of the United States Of America, patent application filed on May 21, 2010 and accorded Application Number 13/320,902 United States Of America, patent application filed on May 21, 2009 and accorded Application Number 61/216,919 (5) all continuations and divisions of all of said patent applications (including further continuations and divisions such as, but not limited to, continuations of continuations and continuations of divisions), ((2)-(5) hereinafter referred to collectively as "patent applications"), (6) all patents that are granted on any of said patent applications, (7) all registrations and confirmations of, and importation certificates based on, one or more of said patents and (8) all reissues, renewals and extensions of said patents, reexamination certificates issued for said patents and supplementary protection certificates based on said patents (including the right to file patent applications on said inventions and discoveries in the names of **ASSIGNEE**, their designees or in any or all of our names, at their election and in accordance with applicable law in all countries and regions and all rights of priority in all countries and regions for all of said patent applications under the International Convention for the Protection of Industrial Property, and all other applicable similar international agreements), the same to be held and enjoyed by said **ASSIGNEE**, their successors, assigns and legal representatives, to the full ends of the terms for which all patents therefor may be granted, as fully and entirely as the same would have been held and enjoyed by us if this sale, assignment and transfer had not been made.

*We hereby authorize **ASSIGNEE** and their representatives to insert in this instrument the Application Number and the filing date of said patent application when notified thereof.

And we hereby covenant and agree that we will, at any time, upon the request and at the expense of **ASSIGNEE**, execute and deliver all documents that may be necessary or desirable to perfect the title to the foregoing inventions and discoveries, patent applications, patents, registrations, confirmations, importation certificates, reissues, renewals, extensions, reexamination certificates and supplementary protection certificates in **ASSIGNEE**, their successors, assigns or other legal representatives, including the execution and procurement of all further documents evidencing this sale, assignment and transfer as may be necessary or desirable for recording the same in the patent office or other intellectual property office, agency or the like of any country or region, that we will, at any time, upon the request and at the expense of **ASSIGNEE**, execute all additional patent applications, applications for registration and/or confirmation of one or more of said patents, applications for certificates of importation based on one or more of said patents, applications for reissues, renewals and extensions of one or more of said patents and supplemental protection certificates based upon one or more of said patents, and that we will make all rightful oaths and declarations and do all lawful acts requisite for procuring the same or for aiding therein, without further compensation, but at the expense of **ASSIGNEE**, the successors, assigns or other legal representatives.

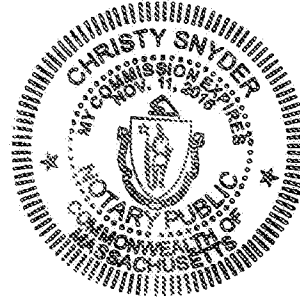
This Assignment is effective as from the earliest priority date as stated above.

Executed this 13 day of March, 2012.

PAIR 14
Name: Phillip DORMITZER

ACKNOWLEDGEMENT

State of Massachusetts)
) s.s.:
County of Middlesex)



On this 13 day of March, 2012, personally appeared before me
Phillip Dormitzer to me known and known by me to be the same person described
in and who executed the foregoing Assignment and acknowledged that (s)he executed the same of his (her)
own free will for the purpose set forth.

(Seal)

[Signature]
Notary Public

Executed this _____ day of _____, 2012.

Name: Michael FRANTI

WITNESS #1 Signature

WITNESS #1 Printed or Typed Name

WITNESS #2 Signature

WITNESS #2 Printed or Typed Name

Executed this 13th day of March, 2012.

Peter H. Mason

Name: Peter MASON

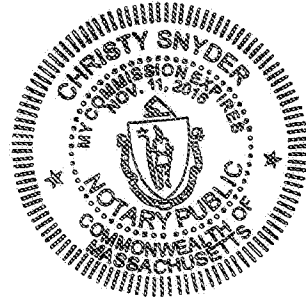
ACKNOWLEDGEMENT

State of Massachusetts)
) s.s.:
County of Middlesex)

On this 13 day of March, 2012, personally appeared before me Peter H. Mason to me known and known by me to be the same person described in and who executed the foregoing Assignment and acknowledged that (s)he executed the same of his (her) own free will for the purpose set forth.

(Seal)

Christy Snyder
Notary Public



Executed this 13 day of March, 2012.

Pirada Suphaphiphat

Name: Pirada SUPHAPHIPHAT

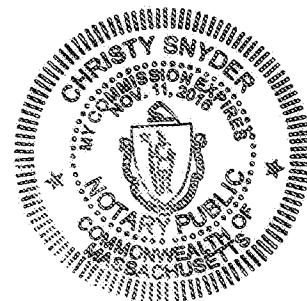
ACKNOWLEDGEMENT

State of Massachusetts)
) s.s.:
County of Middlesex)

On this 13 day of March, 2012, personally appeared before me Pirada Suphaphiphat to me known and known by me to be the same person described in and who executed the foregoing Assignment and acknowledged that (s)he executed the same of his (her) own free will for the purpose set forth.

(Seal)

Christy Snyder
Notary Public



ASSIGNMENT

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*We hereby authorize **ASSIGNEE** and their representatives to insert in this instrument the Application Number and the filing date of said patent application when notified thereof.

And we hereby covenant and agree that we will, at any time, upon the request and at the expense of **ASSIGNEE**, execute and deliver all documents that may be necessary or desirable to perfect the title to the foregoing inventions and discoveries, patent applications, patents, registrations, confirmations, importation certificates, reissues, renewals, extensions, reexamination certificates and supplementary protection certificates in **ASSIGNEE**, their successors, assigns or other legal representatives, including the execution and procurement of all further documents evidencing this sale, assignment and transfer as may be necessary or desirable for recording the same in the patent office or other intellectual property office, agency or the like of any country or region, that we will, at any time, upon the request and at the expense of **ASSIGNEE**, execute all additional patent applications, applications for registration and/or confirmation of one or more of said patents, applications for certificates of importation based on one or more of said patents, applications for reissues, renewals and extensions of one or more of said patents and supplemental protection certificates based upon one or more of said patents, and that we will make all rightful oaths and declarations and do all lawful acts requisite for procuring the same or for aiding therein, without further compensation, but at the expense of **ASSIGNEE**, the successors, assigns or other legal representatives.

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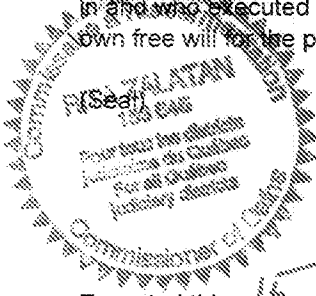
Executed this _____ day of _____, 2012.

Name: Phillip DORMITZER

ACKNOWLEDGEMENT

State of Québec)
) s.s.:
County of Canada)

On this 15th day of March, 2012, personally appeared before me
Michael Franti to me known and known by me to be the same person described
in and who executed the foregoing Assignment and acknowledged that (s)he executed the same of his (her)
own free will for the purpose set forth.



[Signature]
Notary Public

Executed this 15 day of March, 2012.

[Signature]
Name: Michael FRANTI

Jessica Desjardins
WITNESS #1 Signature

Jessica Desjardins
WITNESS #1 Printed or Typed Name

[Signature]
WITNESS #2 Signature

MARIE-KRISTINE LABERGE
WITNESS #2 Printed or Typed Name

Executed this _____ day of _____, 2012.

Name: Peter MASON

ACKNOWLEDGEMENT

State of _____)
) s.s.:
County of _____)

On this _____ day of _____, 20_____, personally appeared before me _____ to me known and known by me to be the same person described in and who executed the foregoing Assignment and acknowledged that (s)he executed the same of his (her) own free will for the purpose set forth.

(Seal)

Notary Public

Executed this _____ day of _____, 2012.

Name: Pirada SUPHAPHIPHAT

ACKNOWLEDGEMENT

State of _____)
) s.s.:
County of _____)

On this _____ day of _____, 20_____, personally appeared before me _____ to me known and known by me to be the same person described in and who executed the foregoing Assignment and acknowledged that (s)he executed the same of his (her) own free will for the purpose set forth.

(Seal)

Notary Public